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ABSTRACT

In 1994 the Governor of California directed the California Commission on Teacher Credentialing to conduct a study of teacher preparation programs to assess the extent to which these programs prepare candidates for teaching credentials to teach critical thinking and problem-solving skills in elementary and secondary schools. With assistance from the Center for Critical Thinking at Sonoma State University, the Commission designed an interview protocol for telephone interviews with education and subject matter faculty in public and private colleges of education. A total of 140 interviews were completed, representing a 78% response rate among those contacted for an interview. Although most said that critical thinking was a primary objective of their instruction, only 19% gave a clear explanation of what critical thinking is, and only 9% were clearly teaching for critical thinking on a typical class day. Fifty percent of those interviewed said that they explicitly distinguish critical thinking skills from traits, but only 8% provided a clear conception of the critical thinking skills they thought were most important for students to develop. Seventy-seven percent of respondents provided limited or no conception of how to reconcile content coverage with the fostering of critical thinking. Education faculty were slightly more likely to state that critical thinking is of primary importance to their instructional objectives than were Arts and Sciences faculty. An attempted analysis of exemplary practices in teaching critical thinking shows that teachers actually do not teach for critical thinking, but simply assume that they intuitively grasp its concepts and teach for it. Approaches to change this perception are suggested. (SLD)

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TEACHERS OF TEACHERS: EXAMINING PREPARATION FOR CRITICAL THINKING

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TEACHERS OF TEACHERS: EXAMINING PREPARATION FOR CRITICAL THINKING

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On September 29, 1994 Governor Wilson signed legislation authored by Senator Leroy Greene (SB1849) directing the California Commission on Teacher Credentialing to conduct a study of teacher preparation programs to assess the extent to which these programs prepare candidates for teaching credentials to teach critical thinking and problem-solving skills in elementary and secondary schools.

During the spring of 1995, Commission staff began to conceptualize a study design that would yield descriptive information on course content and teaching practices being employed by postsecondary faculty to train teacher candidates. With assistance from the Center for Critical Thinking at Sonoma State University, an interview protocol was designed for use in telephone interviews with a cross-section of education and subject matter faculty in both public and private colleges and universities in California.

During the study planning process, a decision was made to design respondent selection procedures in such a way as to assure that information collected would be generalizable to all faculty preparing teachers across the state. To accomplish this objective, two statewide probability samples were designed: a sample of teacher education faculty based in Schools of Education, and a separate sample of Arts and Sciences faculty teaching courses in Commission-approved subject matter programs.

There were three major objectives in this study. The first was to assess current teaching practices and knowledge of critical thinking among faculty teaching in teacher preparation programs in California. The second was to identify exemplary teaching practices that enhance critical thinking. The third was to develop policy recommendations based on the results of the study.

The Concept of Critical Thinking And Problem Solving Used in the Study

The concept of critical thinking and problem solving used in this study is "minimalist," that is, one which captures the essential dimensions of the concept reflected in the following: its etymology and dictionary definition, major definitions and explanations in the literature, a brief history of the idea, major tests of critical thinking, and the basic values it presupposes.

This minimalist concept of critical thinking is embedded not only in a core body of research over the last 30 to 50 years but also derived from roots in ancient Greek. The word 'critical' derives etymologically from two Greek roots: "kriticos" (meaning discerning judgment) and "kriterion" (meaning standards). Etymologically, then, the word implies the development of "discerning judgment based on standards." In Webster's New World Dictionary, the relevant entry reads "characterized by careful analysis and judgment" and is followed by the gloss: "critical, in its strictest sense, implies an attempt at objective judgment so as to determine both merits and faults." Applied to thinking, then, we might provisionally define critical thinking as thinking that explicitly aims at well-founded judgment and hence utilizes appropriate evaluative standards in the attempt to determine the true worth, merit, or value of something.

The tradition of research into critical thinking reflects the common perception that human thinking left to itself often gravitates toward prejudice, over-generalization, common fallacies, self-deception, rigidity, and narrowness. The critical thinking tradition seeks ways of understanding the mind and then training the intellect so that such "errors", "blunders", and "distortions" of thought are minimized. It assumes that the capacity of humans for good reasoning can be nurtured and developed by an educational process aimed directly at that end. It assumes that sound critical thinking maximizes

our ability to solve problems of importance to us by helping us both to avoid common mistakes and to proceed in the most rational and logical fashion.

For example, those who think critically typically engage in intellectual practices of the following sort. They regularly monitor, review, and assess: goals and purposes; issues and problems; information, data, or evidence; interpretations of such information, data, or evidence; quality of reasoning; basic concepts or ideas; assumptions made; implications and consequences; points of view and frames of reference. In monitoring, reviewing and assessing these intellectual constructs those who think critically characteristically strive for clarity, precision, accuracy, relevance, depth, breadth, and logicalness. Each of these modes of thinking serve to accomplish the ends for which we are thinking and hence to solve the problems inherent in pursuing those ends.

Current Teaching Practices and Knowledge of Critical Thinking

In-depth interviews were utilized to provide information on how faculty tend to think about critical thinking and the manner in which that thinking influences the design of their classes. Questions were designed to shed light on the extent to which students in teacher preparation programs in California are being taught in ways that facilitate skill in critical thinking and the ability to teach it to others.

There were three goals of this component of the study. The first was to ensure that any faculty who had a developed notion of critical thinking (of any kind) would have a full opportunity and much encouragement to spell out that notion. We wanted to make sure that everyone interviewed was encouraged to express their actual views and to express them in detail.

The second goal was to examine the views expressed to see: a) how many faculty actually had a developed view and b) how much internal coherence there was in any given faculty view. In other words, we sought to determine how many faculty had seriously thought through the concept of critical thinking--irrespective of how they defined it--and then, once we had a full expression of any given person's views, we examined what was said, not only for clarity but also for coherence.

The third goal was to determine the extent to which the views expressed demonstrated an internalization of traditional "minimalist" elements of critical thinking. We sought to determine, in other words, how much of the common core of meaning now attached to the traditional concept by those working in the field of critical thinking research (and reflected in its semantics and history) has been internalized by faculty teaching in teacher preparation programs.

Data collection included both closed-ended and open-ended questions. In addition, the coders of responses made judgments about some important global features of the responses made (using minimalist components of critical thinking as criteria). The open-ended questions, and the follow-up questions, were designed, as indicated above, to provide maximum opportunity for individuals to articulate virtually any concept of critical thinking that they favored. The follow-up questions' main function was that of ensuring that the most specific and precise views that could be obtained were obtained. Since the interviews lasted 45 minutes on average, the interviewees had ample opportunity to express their views.

The same interview protocol was utilized for both education faculty and subject matter faculty. A total of 140 interviews were completed, representing a 78% response rate among those contacted for an interview. Since the samples were constructed so as to be representative in a statistical sense of all faculty involved in teacher preparation in California, the results can in fact be generalized to teacher preparation faculty in the state as a whole. The results of the analysis were as follows:

1) Though the overwhelming majority (89%) claimed critical thinking to be a primary objective of their instruction, only a small minority (19%) gave a clear explanation of what critical thinking is. Furthermore, according to their answers, only 9% of the respondents were clearly teaching for critical thinking on a typical day in class.

2) Though the overwhelming majority (78%) claimed that their students lacked appropriate intellectual standards (to use in assessing their thinking), and 73% considered that students learning to assess their own work was of primary importance, only a very small minority (8%) enumerated any intellectual criteria or standards they required of students or gave an intelligible explanation of what those criteria and standards were.

3) While 50% of those interviewed said that they explicitly distinguish critical thinking skills from traits, only 8% provided a clear conception of the critical thinking skills they thought were most important for their students to develop. Furthermore the overwhelming majority (75%) provided either minimal or vague allusion (33%) or no allusion at all (42%) to intellectual traits of mind.

4) When asked how they conceptualized truth, a surprising 41% of those who responded to the question said that knowledge, truth and sound judgment are fundamentally a matter of personal preference or subjective taste.

5) Although the majority (67%) said that their concept of critical thinking is largely explicit in their thinking, only 19% elaborated on their concept of thinking.

6) Although the vast majority (89%) stated that critical thinking was of primary importance to their instruction, 77% of the respondents provided limited or no conception of how to reconcile content coverage with the fostering of critical thinking.

7) Although the overwhelming majority (81%) felt that their department's graduates develop a good or high level of critical thinking ability while in their program, only 20% said that their departments had a shared approach to critical thinking, and only 9% clearly articulated how they would assess the extent to which a faculty member was or was not fostering critical thinking. The remaining respondents had a limited conception or no conception of how to do this.

8) Although the vast majority (89%) stated that critical thinking was of primary importance to their instruction, only a very small minority clearly explained the meanings of basic terms in critical thinking. For example, only 8% clearly differentiated between an assumption and an inference, and only 4% differentiated between an inference and an implication.

9) Only a very small minority (9%) mentioned the special and/or growing need for critical thinking today in virtue of the pace of change and the complexities inherent in human life. Not a single respondent elaborated on the issue.

10) In explaining their views of critical thinking, the overwhelming majority (69%) made either no allusion at all, or a minimal allusion, to the need for greater emphasis on peer and student self-assessment in instruction.

Some differences were also observed between Education and Arts and Sciences faculty. These differences do not alter the overall findings but do suggest relative strengths and weaknesses for each group. The comparative results were as follows:

1) Education faculty were slightly more likely (91%) to state that critical thinking is of primary importance to their instructional objectives than Arts and Sciences faculty (82%).

2) Education faculty were somewhat more likely (55%) to include in their concept of critical thinking a distinction between critical thinking skills and traits than Arts and Sciences faculty (39%), though neither group effectively articulated that difference.

3) Education faculty were somewhat better in articulating how they bring critical thinking into the curriculum on a typical class day (33% of the Arts and Sciences faculty provided little or no conception of how to do this while only 15% of the Education faculty had the same lack of conception).

4) Education faculty were more likely to elaborate on how they would reconcile content coverage with fostering critical thinking (25% elaborated on reconciliation of these, while only 8% of the Arts and Sciences faculty elaborated on the same point).

5) The Arts and Sciences faculty better articulated the basic skills of thought that students need to effectively address issues and concerns in their lives such as clarifying questions, gathering relevant data or information, formulating or reasoning to logical or valid conclusions, interpretations or solutions, etc. Of the Education faculty, 40% failed to mention any of these basic skills while only 5% of the non-education faculty failed to mention any.

6) The Education faculty were somewhat less likely to ignore the importance of emphasizing problem solving in the classroom than the Arts and Sciences group. Only 10% of this group failed to mention its importance while 26% of the Arts and Sciences faculty failed to mention it.

7) The Education faculty were somewhat less likely to ignore the special need for critical thinking today in virtue of such phenomena as accelerating change, intensifying complexity, and increasing interdependence (64% of the Arts and Sciences faculty failed to mention its importance, while 51% of the education group failed to mention it).

8) The Education faculty were less likely to ignore the need for emphasis on peer and student self-assessment (33% percent of this group failed to mention it, while 55% of the Arts and Sciences group failed to mention it).

Analysis of open-ended responses provided not only confirmation of the quantitative data, but also powerful support for significant qualitative generalizations. What is more, a close look at individual cases reveals that there is significant contrast between those faculty members who have a developed concept of critical thinking and those who do not. Profiles of individual faculty responses are presented in the full report to illustrate clearly the kind of differences which existed between those who were articulate in explaining how they approach critical thinking and those who were not.

Most faculty answered open-ended questions with vague answers, rather than clear and precise answers. In many of their answers there were internal "tensions" and in some cases outright contradictions. The magic talisman were phases like "constructivism", "Bloom's Taxonomy", "process-based", "inquiry-based", "beyond recall", "active learning", "meaning-centered" and similar phrases that under probing questions the majority of interviewees did not explain in terms of critical thinking. The most common confusion, perhaps, was a confusion between what is necessary (for critical thinking) and what is sufficient (for it). For example, active engagement is necessary to critical thinking, but one can be actively engaged and not think critically.

Virtually all of those interviewed identified critical thinking and the learning of intellectual standards as primary objectives in instruction, yet few gave clear explanation of what their concept of either was. Virtually all said that students lacked intellectual standards when they entered their classes, yet implied, at the same time, that they left with those intellectual standards in place. They also overwhelmingly stated or implied that their students left them with a good level of critical thinking as well as a good level of ability to foster critical thinking in their future students.

By direct statement or by implication, most claimed that they permeated their instruction with an emphasis on critical thinking and that the students internalized the concepts in their courses as a result. Yet, only the rare interviewee mentioned the importance of students thinking clearly,

accurately, precisely, relevantly, or logically. Very few mentioned any of the basic skills of thought such as the ability to clarify questions; gather relevant data; reason to logical or valid conclusions; identify key assumptions; trace significant implications; or enter without distortion into alternative points of view. Intellectual traits of mind, such as intellectual humility, intellectual perseverance, and intellectual responsibility, are virtually unheard of by the interviewees.

Exemplary Practices

The second component of the study was to identify exemplary teaching practices and to determine, in a rough and general way, why some few faculty are doing an exemplary job of teaching for critical thinking while many others are not. We assembled candidates for exemplary practices in all of the following ways, with the following results:

1) Direct solicitation of exemplary practices from all campuses with approved teacher preparation programs. In late January of 1996, the Commission's Executive Director sent a letter to all Deans of Schools of Education and Deans of Colleges of Arts and Sciences asking that faculty be encouraged to submit examples to the Commission of program design, course design, assessment of teaching for critical thinking, and teaching strategies. There was comparatively little work forwarded as a result of this direct solicitation, and of the work forwarded only a small percentage had sufficient detail to allow us to determine how they conceived critical thinking or how they taught for it.

2) Follow-up interviews of "strong profiles" from the initial interviewees. Only a small percentage of those interviewed qualified as providing "strong" answers in the initial telephone interview. These individuals were recontacted to obtain additional information on their teaching practices. Several of these, but not all, qualified for presentation as exemplary cases.

3) Direct solicitation of faculty who have participated in critical thinking professional development. This solicitation produced a much higher percentage of responses and the quality of the responses were higher, in general, than the quality of responses (in terms of clarity, elaborateness, and coherence) in our solicitations outlined in 1) and 2) above.

4) Random samples from work turned in at critical thinking workshops for post-secondary faculty. As in our solicitation to those faculty who have participated in critical thinking professional development, this aspect of our study produced examples of work strongly suggestive of exemplary teaching practice (though it was not possible to interview the original authors of the work to probe beyond the initial global design).

Our analysis of the results of our search for "exemplary" practices in teaching for critical thinking, are, on the whole, straight-forward and pretty much in keeping with "common sense." The overwhelming majority of post-secondary faculty, being under no formal requirement to systematically study the research on critical thinking nor how to teach for it, have not done so. The overwhelming majority simply assume that they intuitively grasp critical thinking and unquestionably teach for it. However, since this majority have not, in fact, thought much about critical thinking and have had no formal professional development in it, they are hard pressed to explain what critical thinking is (in a clear, elaborated, and coherent fashion) and are equally hard pressed to explain how they teach so as to foster it.

On the other hand, the faculty that have systematically studied critical thinking and have taken the time to participate in critical thinking professional development demonstrate a much higher ability to explain the concept (clearly and coherently) and integrate strategies conducive to it into their instruction. As professional educators we advocate organized and systematic study in order to achieve knowledge and skill; hence, it is not remarkable that those

who have participated in organized and systematic study of critical thinking and how to teach for it have more knowledge and skill in it than those who have not.

Policy Recommendations

If it is essential for teachers in California to foster critical thinking, then it is essential for those who teach the teachers to have at least a baseline knowledge of the concept of critical thinking. Those who teach prospective teachers must be sufficiently well-informed about critical thinking not only to be able to explain it in a general way to their students, they must also regularly model instruction for critical thinking in their own classroom procedures and policies. The design of their classes must reflect an explicit critical thinking orientation, so that students not only systematically think through the content of their courses, but also come to see how the design of a course can require and cultivate critical thinking and thoughtfulness--or fail to do so.

In our view, five interventions are requisite for substantive change to occur. First, we must disseminate the information faculty need to change their perceptions. Second, we must provide for faculty skill-building through appropriate professional development. Third, we must establish strong accreditation standards for preparation in critical thinking in all teacher education programs. Fourth, we must strengthen and reinforce teacher preparation for critical thinking instruction by creating career-long credential expectations. Fifth, we need to include knowledge and skill related to critical thinking in all teaching credential examinations. Let us look at each of these proposed interventions in turn.

1) **Information Dissemination**: Sufficient awareness, grounded in intellectual humility, must be generated in those communities of faculty teaching in teacher preparation programs leading to the recognition a) that there is a general lack of knowledge on the part of the teaching faculty of the baseline concept of critical thinking, and b) that most students in teacher preparation programs are now graduating without knowledge of critical thinking or how to teach for it. There are seven forms of information that need wide dissemination. At present none of these categories of information are widely disseminated in the teaching community. The categories are as follows:

- We need to disseminate information that documents the problem at the K-12 teaching level.
- We need to disseminate information on teaching for critical thinking within particular disciplines (such as math).
- We need to disseminate information about the process that faculty go through as they initially develop their ability to bring critical thinking successfully into the classroom (especially regarding those who display intellectual humility).
- We need to disseminate information about exemplary teaching practices of individuals, as they reach high levels of success.
- We need to disseminate information about model programs (which demonstrate how networks of courses can be designed to foster critical thinking).
- We need to disseminate information about models from schools of education who successfully integrate critical thinking into their classes.
- And we need to disseminate information about model textbooks which abandon the encyclopedia style of writing in favor of a concise but systematic emphasis on developing critical thinking within the discipline.

2) **Skill Building**: If graduate and undergraduate faculty who are involved in teacher preparation are to incorporate an emphasis on critical thinking into their instruction, then appealing opportunities should be provided for professional development in critical thinking. Effective professional development must not only provide a baseline conceptualization that is fully in keeping with the traditional purposes of critical thinking, but it must also show how critical thinking can be integrated into the teaching of all subject areas and disciplines. It must enable faculty to begin to reconceptualize the design of their instruction so so as to bring greater intellectual quality, intellectual discipline, and intellectual standards into the heart of instruction. Professional development opportunities should not

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advocate any particular definition of critical thinking. Rather, they should encourage the faculty to integrate the core concepts of critical thinking into their particular disciplinary specialties according to their own preferred definitions or definitional emphases.

3) **Accreditation Standards**: In the course of re-structuring the requirements for teaching credentials (as a result of SB1422), the Commission should consider establishing four kinds of expectations to teach critical thinking. First, the Commission should expect institutions to teach prospective teachers to think critically in the course of common, general discourse. Second, there should be expectations about learning to think critically within each of the subjects that prospective teachers study (e.g., history, mathematics, government, science). Third, the Commission should expect prospective teachers to know how to design instruction so that, once they become teachers, they foster the critical thinking of their students. Finally, new teachers should enter the profession with "habits of mind" that include critical reflectivity about their own teaching.

4) **Career-Long Credential Expectations**: In recent years, the Commission on Teacher Credentialing has exerted leadership in the creation of induction programs that are expecially designed for beginning teachers (defined as first-year and second-year practitioners). To date, the standards for beginning teachers and their induction programs have (1) given no attention to the role of new teachers as instructors of critical thinking, and (2) given no attention to critical thinking as a domain of knowledge and skill that new teachers are expected to acquire and use. Both of these omissions should be corrected by the Commission as part of a broader effort to incorporate attention to critical thinking skills and concepts in the preliminary preparation, initial induction, and ongoing professional growth of future teachers.

Teachers are required in California to renew their teaching credentials at five-year intervals. The renewal of their credentials is based on completion of "individual programs of professional growth," which are subject to state regulation and local monitoring. The Commission should explore whether individual programs of professional growth for practicing teachers should include specific instruction in critical thinking as well as the teaching of critical thinking in elementary and secondary schools. As teacher's careers unfold, and as they renew their professional credentials after each five-year period, they could be expected to attain increasingly advanced levels of proficiency as teachers of critical thinking to their K-12 students.

5) **Teaching Credential Examinations**: Critical thinking must be assessed extensively in teaching credential examinations to ensure that faculty members and prospective teachers take seriously the importance of critical thinking. When prospective teachers know that they will be facing a rigorous assessment of their critical thinking knowledge and skill, their motivation to learn it will be significantly heightened. All existing Commission-sponsored examination programs need to be analyzed to determine (1) the extent to which the current exams assess critical thinking knowledge and skill, and (2) whether a critical thinking component could and should be developed and scored within each of these assessments.

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